

**NEWMARKET -
E. GWILLIMBURY**

**water pollution
control plant**

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ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET, TORONTO 5
OFFICE OF THE GENERAL MANAGER

Members of the Newmarket-East Gwillimbury Local
Advisory Committee,
Town of Newmarket and Township of East Gwillimbury.

Gentlemen:

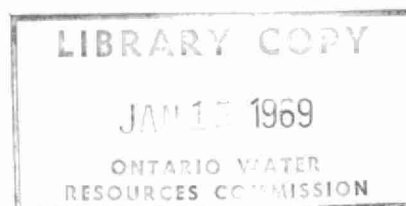
We are happy to present you with the 1967 Operating Summary for the
Newmarket-East Gwillimbury Water Pollution Control Plant, OWRC Pro-
ject No. 2-0087-61.

Your co-operation with our staff throughout the year has been appreciated.
Only with such co-operation can the war against water pollution be waged
effectively.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
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J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to submit to you the 1967 Operating Summary for the Newmarket-East Gwillimbury Water Pollution Control Plant, OWRC Project No. 2-0087-61.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

A handwritten signature in cursive script, reading "D. A. McTavish".

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

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NEWMARKET-EAST GWILLIMBURY
water pollution control plant

operated for

THE TOWN OF NEWMARKET

and

THE TOWNSHIP OF EAST GWILLIMBURY

by the

ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

DIRECTOR: D. A. McTavish

Assistant Director: C. W. Perry
Regional Supervisor: P. J. Osmond
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'67 REVIEW

The total operating cost for 1967 was \$39,215.29, an increase of 1.7 percent from the 1966 costs. The cost per million gallons of sewage treated decreased from \$70.41 in 1966 to \$64.66. This represents a decrease of approximately 8.2 percent. The cost per pound of BOD removed was 4 cents in 1967. This unit cost has remained constant since the plant began operation in the summer of 1964.

A total of 606.46 million gallons of raw sewage was treated in 1967, an increase of 10.8 percent from the total of 547.45 million gallons treated in 1966. The average daily flow in 1967 was 1.66 mgd or 83 percent of the design dry weather flow of 2.0 mgd.

The average BOD and suspended solids reductions were 90.6 and 93.7 percent respectively.

A total of 1,945,200 gallons of raw sludge was pumped to the digester and a total of 986,505 gallons of digested sludge was hauled from the site at a total cost of \$5,621.40. Gas production totalled 3,654,722 cubic feet.

A total of 12,858 pounds of chlorine was used to disinfect the final effluent during the chlorination period in 1967. This total provided a dosage rate of 4.70 ppm, a slight increase over the dosage rate of 4.61 ppm in 1966.

Generally, the plant operated efficiently during the year. The average final effluent concentrations of BOD and suspended solids were within the OWRC objectives of 15 ppm for each.

PROJECT COSTS

NEWMARKET - STAGES 1 and 3

| | | |
|---|------------------|---------------------|
| NET CAPITAL COST (Final) | | \$124,240.90 |
| DEDUCT - Payments from Municipalities | \$23,980.94 | |
| - Portion Financed by CMHC (Estimated) | <u>63,826.81</u> | <u>87,807.75</u> |
| Long Term Debt to OWRC | | \$ <u>36,433.15</u> |
| Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967 | | \$ <u>3,971.44</u> |
| Net Operating | | \$ Nil |
| Debt Retirement | | 735.00 |
| Reserve | | 576.99 |
| Interest Charged | | 2,054.60 |
| | | <hr/> |
| TOTAL | | \$ <u>3,366.59</u> |

RESERVE ACCOUNT

| | |
|------------------------------|--------------------|
| Balance at January 1, 1967 | \$ 2,767.05 |
| Deposited by Municipality | 576.99 |
| Interest Earned | <u>169.65</u> |
| | \$ 3,513.69 |
| Less Expenditures | <hr/> |
| Balance at December 31, 1966 | \$ <u>3,513.69</u> |

NEWMARKET - STAGE 2

| | | |
|---|-------------------|---------------------|
| NET CAPITAL COST (Estimated) | | \$700,694.82 |
| DEDUCT - Payments from Municipalities | \$ 90,000.00 | |
| - Portion Financed by CMHC (Estimated) | <u>449,521.34</u> | <u>539,521.34</u> |
| Long Term Debt to OWRC | | <u>\$161,173.48</u> |
| Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967 | | \$ <u>13,637.85</u> |
| Net Operating | | \$ 27,450.70 |
| Debt Retirement | | 3,252.00 |
| Reserve | | 5,284.63 |
| Interest Charged | | 9,089.12 |
| | | <hr/> |
| TOTAL | | \$ <u>45,076.45</u> |

RESERVE ACCOUNT

| | |
|------------------------------|---------------------|
| Balance at January 1, 1967 | \$ 12,715.37 |
| Deposited by Municipality | 5,284.63 |
| Interest Earned | <u>838.70</u> |
| | \$ 18,838.70 |
| Less Expenditures | <u>2,252.09</u> |
| Balance at December 31, 1966 | \$ <u>16,586.61</u> |

EAST GWILLIMBURY - STAGES 1 and 3

| | | |
|---|----|----------------|
| NET CAPITAL COST | \$ | Nil |
| DEDUCT - Payments from Municipalities | | |
| - Portion Financed by CMHC-MDLB (Estimated) | | |
| Long Term Debt to OWRC | \$ | <u>Nil</u> |
| Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967 | \$ | <u>Nil</u> |
| Net Operating | \$ | Nil |
| Debt Retirement | | Nil |
| Reserve | | 144. 23 |
| Interest Charged | | Nil |
| | | <hr/> |
| TOTAL | \$ | <u>144. 23</u> |

RESERVE ACCOUNT

| | | |
|------------------------------|----|----------------|
| Balance at January 1, 1967 | \$ | 686. 78 |
| Deposited by Municipality | | 144. 23 |
| Interest Earned | | <u>42. 12</u> |
| | \$ | 873. 13 |
| Less Expenditures | | <hr/> |
| Balance at December 31, 1967 | \$ | <u>873. 13</u> |

EAST GWILLIMBURY - STAGE 2

| | |
|---|--------------------------------|
| NET CAPITAL COST (Estimated) | \$284,099.63 |
| DEDUCT - Payments from Municipalities | <u>284,857.04</u> |
| Long Term Debt to OWRC | (\$ <u><u>757.41 cr.</u></u>) |
| Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967 | \$ <u><u>Nil</u></u> |
| Net Operating | \$ 11,764.59 |
| Debt Retirement | - |
| Reserve | 2,265.48 |
| Interest Charged | (42.71 cr.) |
| TOTAL | \$ <u><u>13,987.36</u></u> |

RESERVE ACCOUNT

| | |
|------------------------------|---------------------------|
| Balance at January 1, 1967 | \$ 5,449.52 |
| Deposited by Municipality | 2,265.48 |
| Interest Earned | <u>290.92</u> |
| | \$ 8,005.92 |
| Less Expenditures | <u>896.67</u> |
| Balance at December 31, 1967 | \$ <u><u>7,109.25</u></u> |

MONTHLY OPERATING COSTS

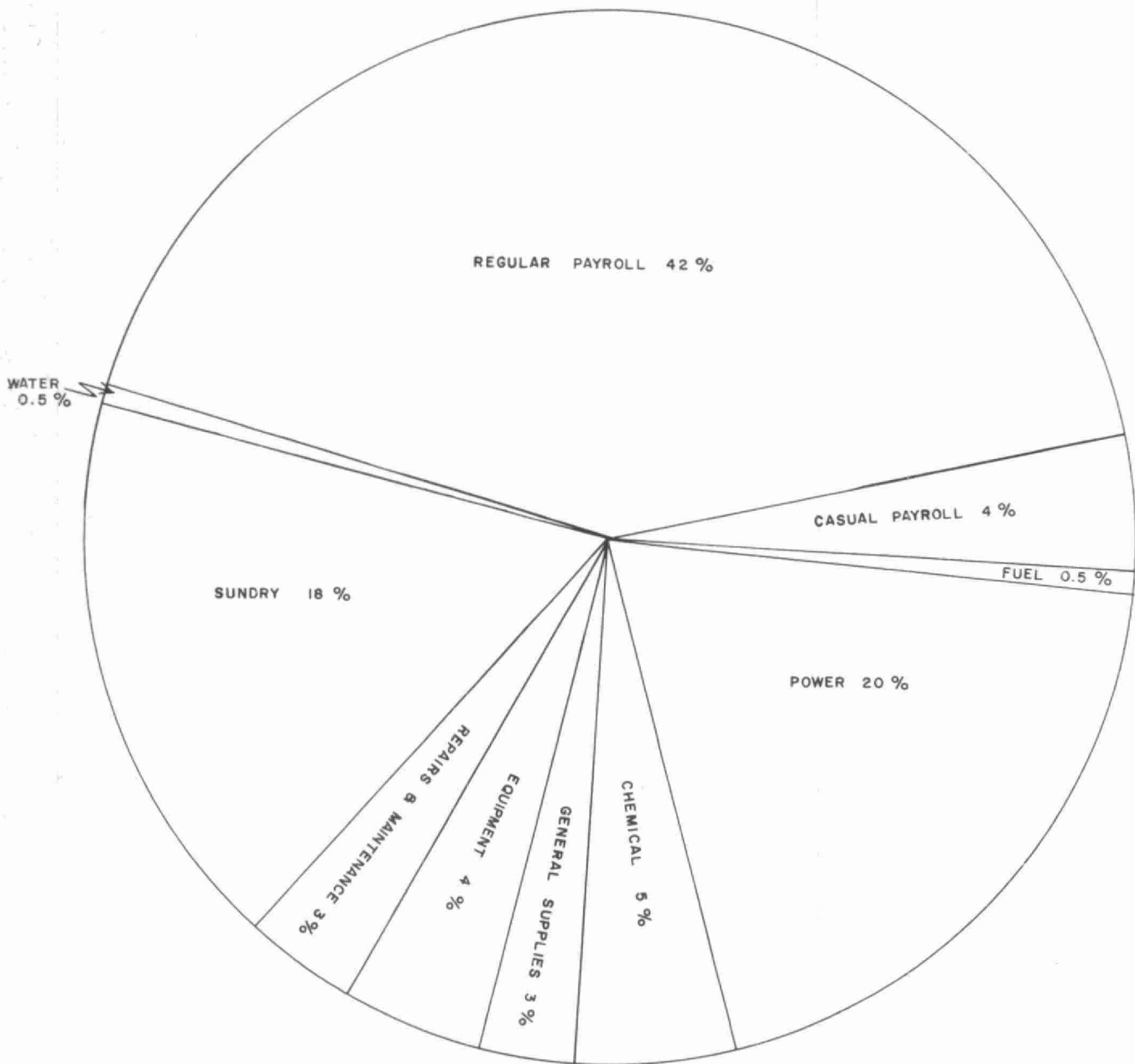
| MONTH | TOTAL EXPENDITURE | PAYROLL | CASUAL PAYROLL | FUEL | POWER | CHEMICAL | GENERAL SUPPLIES | EQUIPMENT | REPAIRS & MAINTENANCE | * SUNDRY | WATER |
|-------|----------------------|-----------|-------------------|--------|----------|----------|---------------------|-----------|--------------------------|-------------|--------|
| JAN | 1,260.96 | 771.71 | 307.26 | | | | 86.49 | (2.42) | 74.60 | 23.32 | |
| FEB | 3,772.68 | 1,106.15 | 179.03 | 117.60 | 651.88 | | 62.61 | 1054.32 | 76.29 | 492.30 | 32.00 |
| MARCH | 3,189.36 | 1,712.86 | | | 595.76 | 63.18 | 86.61 | | 56.25 | 656.70 | 16.00 |
| APRIL | 2,778.74 | 1,357.17 | | | 643.83 | | 41.18 | | 120.42 | 600.14 | 16.00 |
| MAY | 3,051.63 | 1,454.75 | 326.80 | 117.60 | 644.64 | | 62.79 | | 49.76 | 395.29 | |
| JUNE | 3,756.37 | 1,336.56 | 328.68 | | 661.25 | 570.94 | 75.99 | 105.17 | 107.89 | 545.89 | 24.00 |
| JULY | 3,097.29 | 1,317.85 | 256.72 | | 680.93 | | 45.03 | 92.40 | 165.16 | 523.20 | 16.00 |
| AUG | 3,681.34 | 1,347.17 | 243.48 | | 637.85 | 548.10 | 66.90 | 414.45 | 3.91 | 403.48 | 16.00 |
| SEPT. | 3,230.93 | 1,968.73 | 16.28 | | 595.33 | | 97.95 | | 152.67 | 399.97 | |
| OCT | 3,153.15 | 1,317.85 | | | 670.29 | 570.94 | 170.80 | | (29.90) | 429.17 | 24.00 |
| NOV | 3,964.45 | 1,317.85 | | | 699.15 | 228.38 | 138.17 | 5.00 | 206.31 | 1353.59 | 16.00 |
| DEC | 4,278.39 | 1,375.64 | | | 1,192.08 | | 176.94 | 53.55 | 335.29 | 1096.89 | 48.00 |
| TOTAL | 39,215.29 | 16,384.29 | 1,658.25 | 235.20 | 7,672.99 | 1981.54 | 1111.46 | 1722.97 | 1320.65 | 6919.94 | 208.00 |

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$5,621.40
BRACKETS INDICATE CREDIT

YEARLY OPERATING COSTS

| YEAR | M.G. TREATED | TOTAL COST | COST PER MILLION GALLONS | COST PER LB OF BOD REMOVED |
|------|--------------|------------|-----------------------------|-------------------------------|
| 1965 | 476.231 | \$32566.48 | \$68.38 | 4 CENTS |
| 1966 | 547.447 | 38546.14 | 70.41 | 4 CENTS |
| 1967 | 606.455 | 39215.29 | 64.66 | 4 CENTS |

1967 OPERATING COSTS



Process Data

FLOWS

The probability of flow graph indicates that the flows in 1967 exceeded the plant design dry weather capacity of 2.0 mgd approximately 25 percent of the time. This represents a substantial increase from 1966, when the flows exceeded the design capacity only 5 percent of the time. This increase can be attributed to the wet weather experienced in 1967.

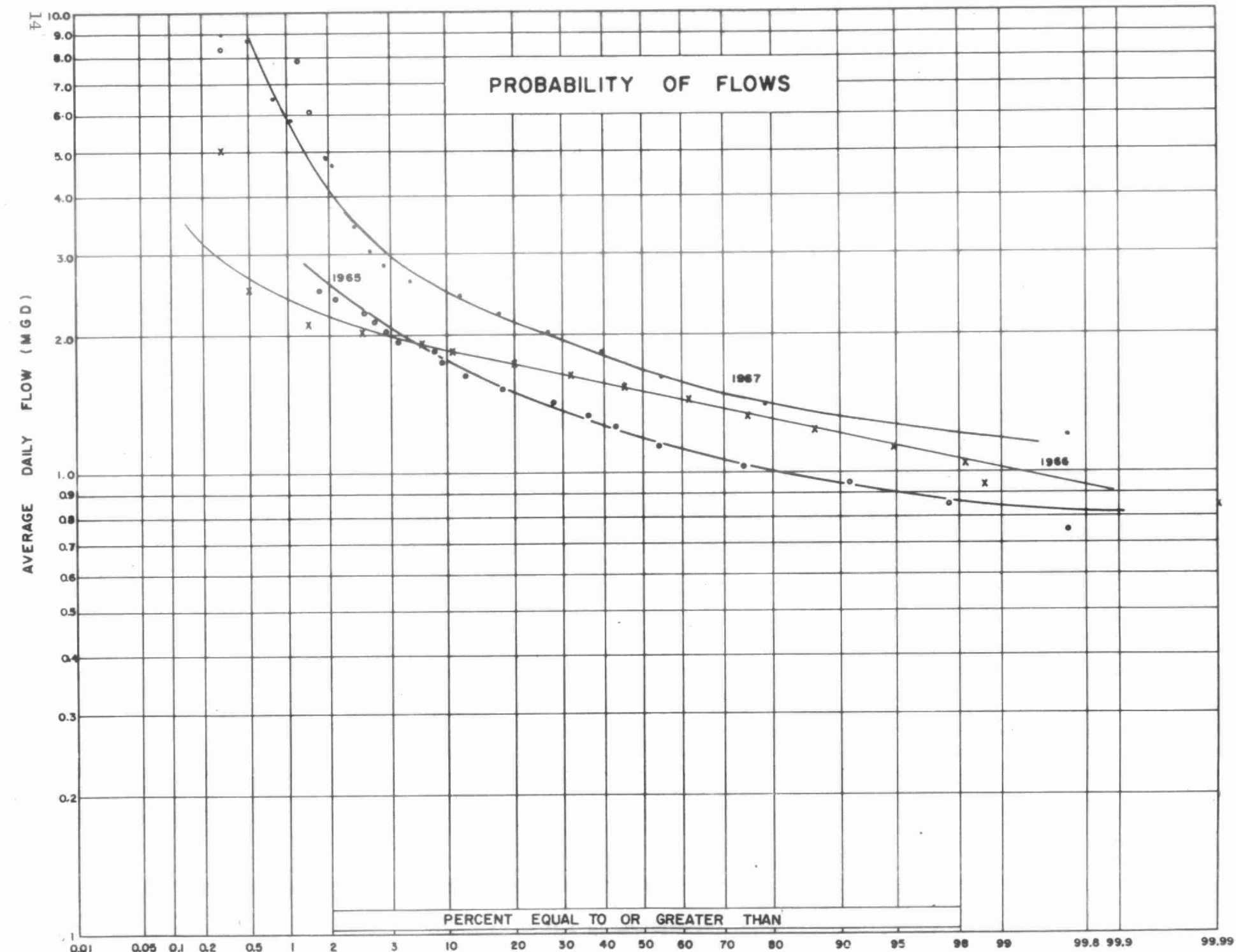
The average daily flow for 1967 was 1.66 mgd. This represents an increase of approximately 10 percent from the average daily flow of 1.50 mgd received during 1966. Once again, the wet weather experienced in 1967, particularly in April and July, accounts for the increase in average daily flow. A general increase in population will cause an increase in the average daily flow as well.

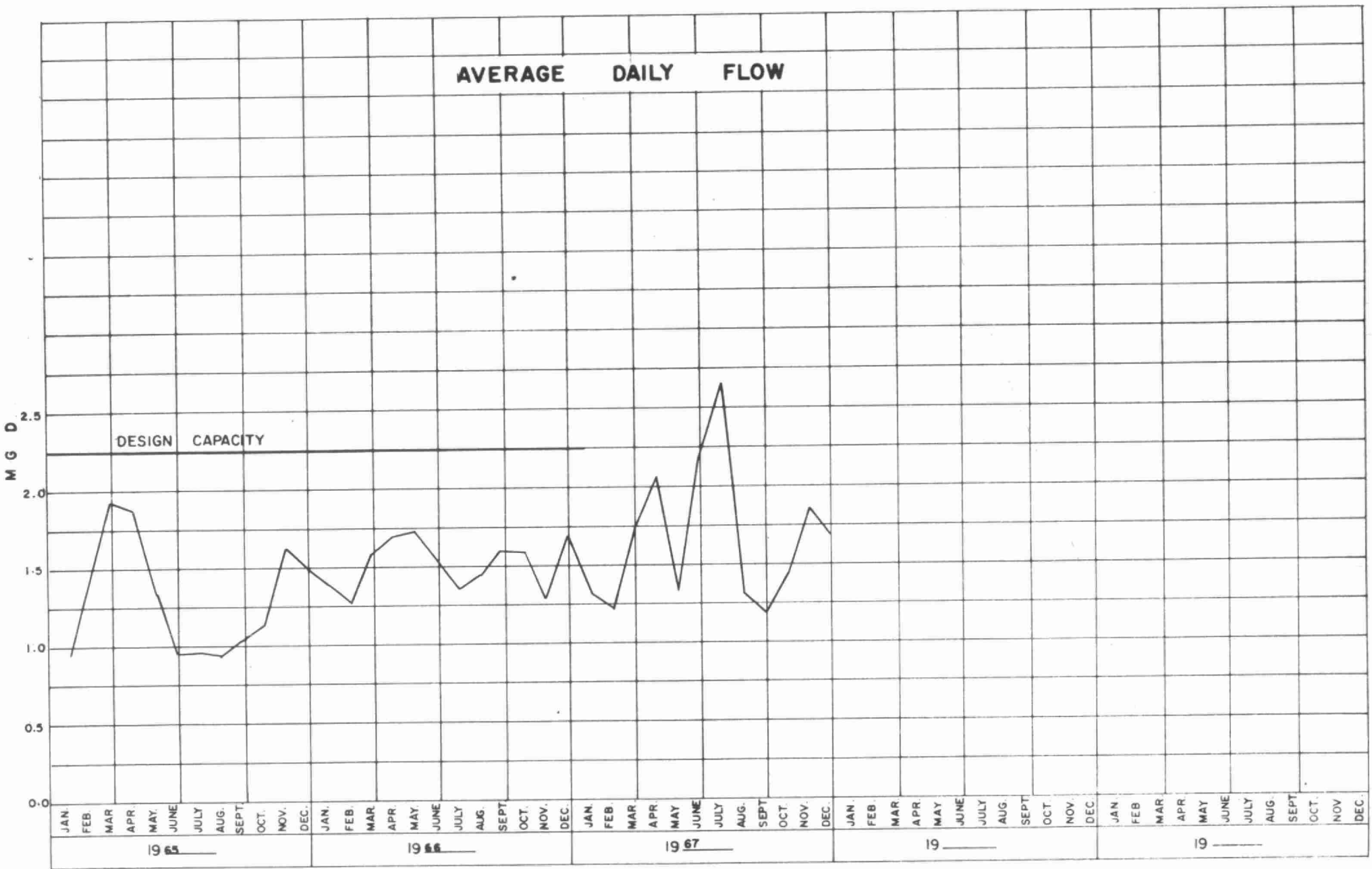
14
AVERAGE DAILY FLOW (MGD)

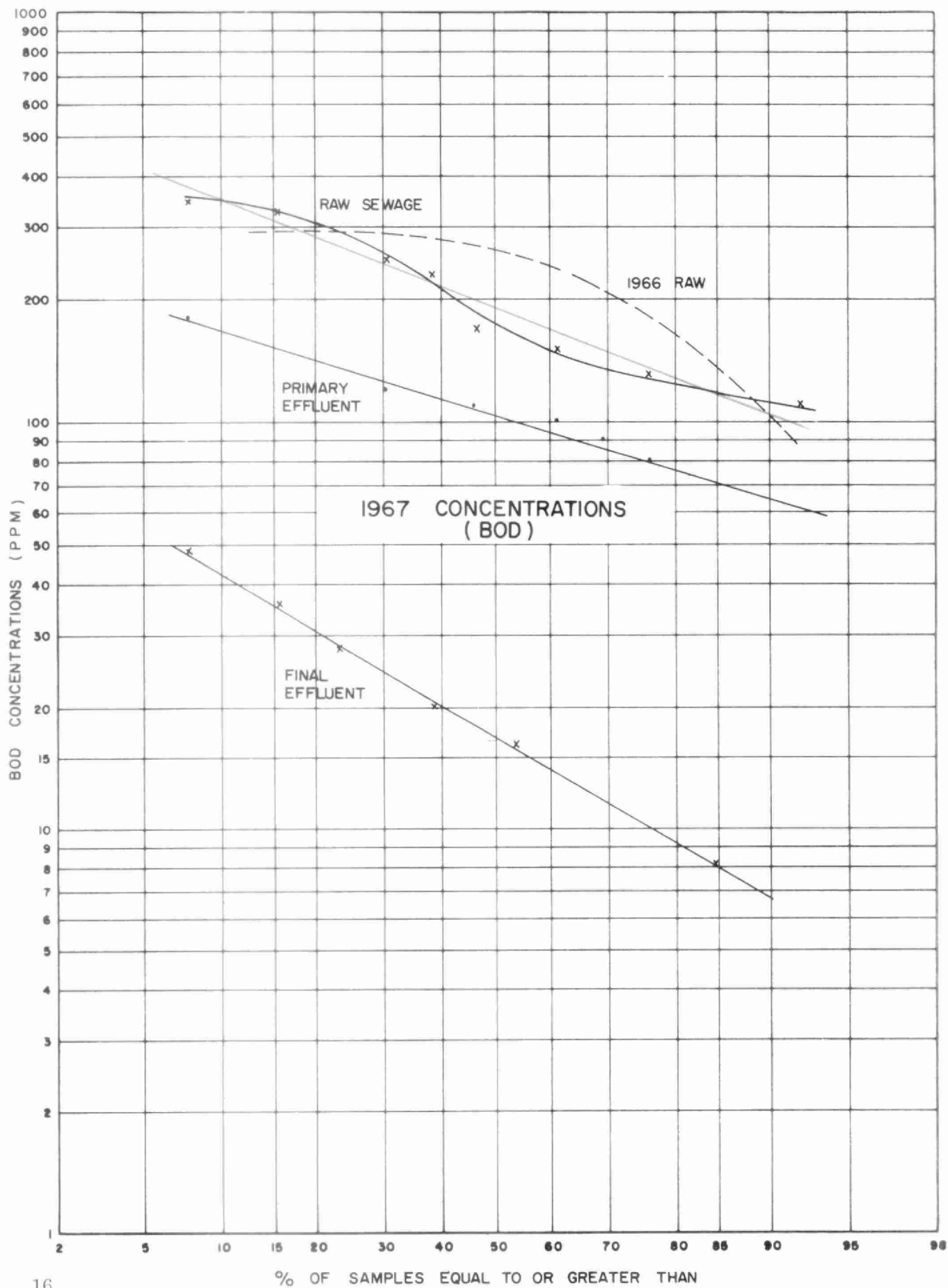
PROBABILITY OF FLOWS

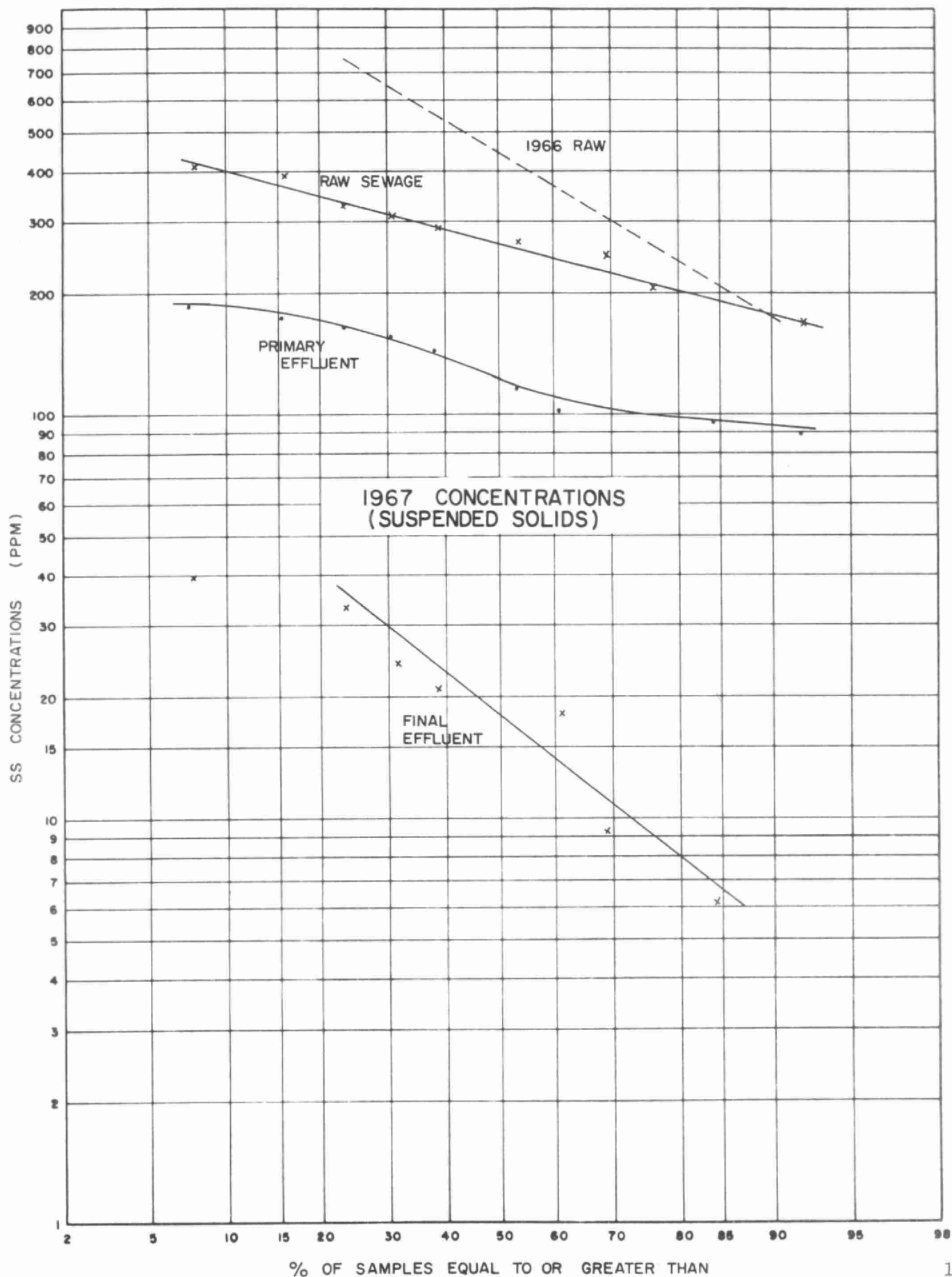
PERCENT EQUAL TO OR GREATER THAN

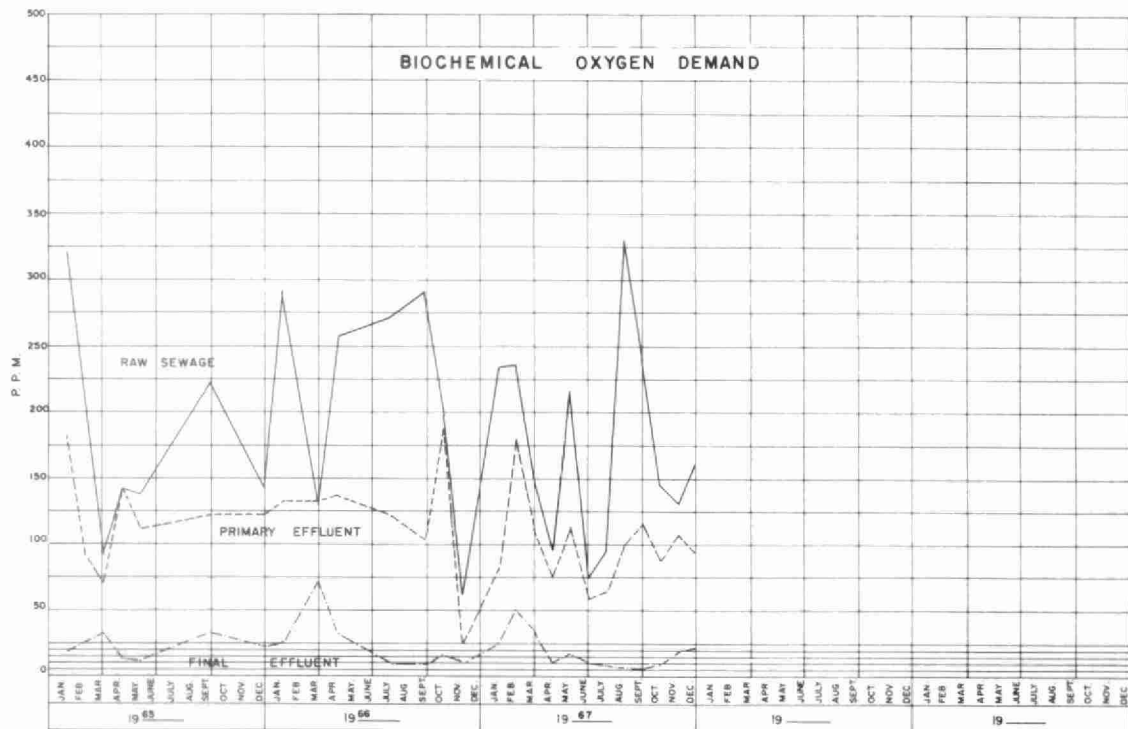
0.01 0.05 0.1 0.2 0.5 1 2 3 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99



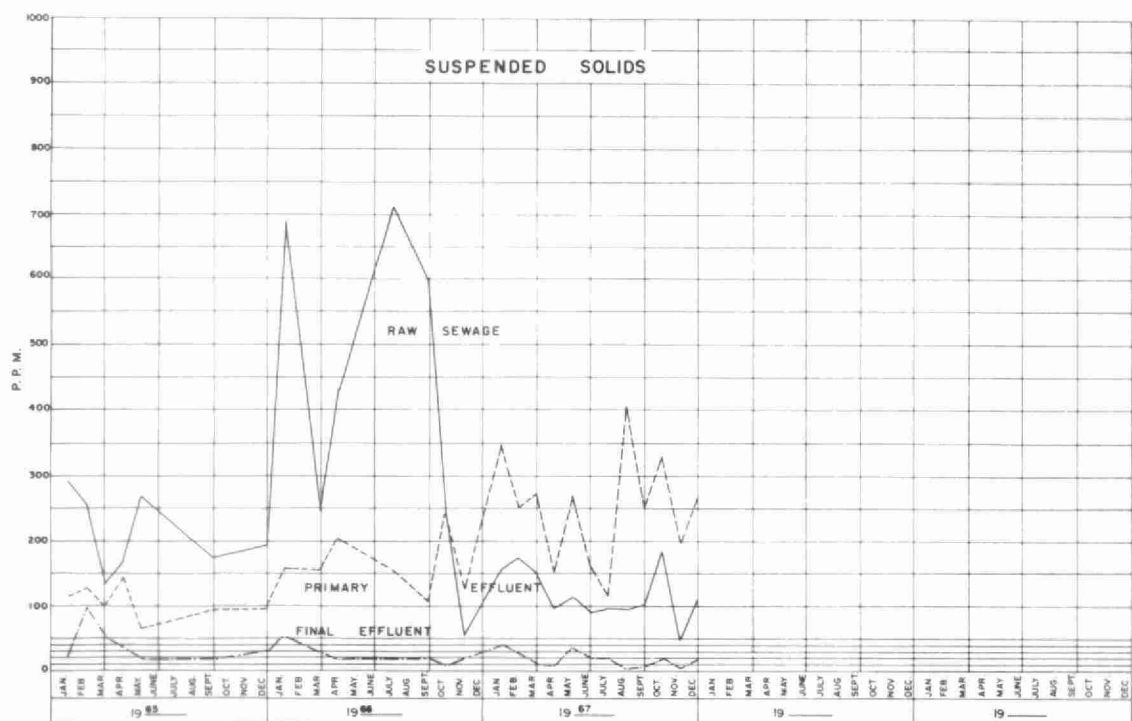








MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

| MONTH | B. O. D. | | | | S. S. | | | | GRIT REMOVAL CU FT |
|-------|------------------|------------------|----------------|-----------------|------------------|------------------|----------------|-----------------|--------------------------|
| | INFLUENT PPM. | EFFLUENT PPM. | % REDUCTION | TONS REMOVED | INFLUENT PPM. | EFFLUENT PPM. | % REDUCTION | TONS REMOVED | |
| JAN. | 233 | 24 | 90.0 | 42.20 | 346 | 34 | 90.2 | 63.00 | 61 |
| FEB. | 235 | 47 | 80.0 | 31.92 | 250 | 22 | 91.2 | 38.70 | 60 |
| MAR. | 143 | 33 | 76.9 | 29.56 | 272 | 9 | 96.7 | 70.68 | 68 |
| APR. | 95 | 8 | 91.6 | 26.60 | 152 | 4 | 97.4 | 45.25 | 76 |
| MAY | 215 | 14 | 93.5 | 41.39 | 270 | 31 | 88.5 | 49.22 | 64 |
| JUNE | 73 | 7.2 | 90.1 | 21.67 | 162 | 19 | 88.3 | 47.10 | 67 |
| JULY | 92 | 4.8 | 94.8 | 35.81 | 134 | 16 | 88.1 | 48.45 | 89 |
| AUG. | 330 | 3.7 | 98.9 | 65.96 | 408 | 2 | 99.5 | 82.07 | 60 |
| SEPT. | 240 | 3.4 | 98.6 | 36.73 | 250 | 6 | 97.6 | 43.50 | 60 |
| OCT. | 144 | 6.2 | 95.7 | 30.60 | 316 | 16 | 94.9 | 66.61 | 58 |
| NOV. | 130 | 15 | 88.5 | 31.79 | 198 | 3 | 98.5 | 45.62 | 64 |
| DEC. | 160 | 18 | 88.8 | 37.10 | 264 | 16 | 93.9 | 64.79 | 68 |
| TOTAL | - | - | - | 431.33 | - | - | - | 664.99 | 795 |
| AVG. | 174 | 15 | 90.6 | 35.94 | 252 | 15 | 93.7 | 55.42 | 66 |

COMMENTS

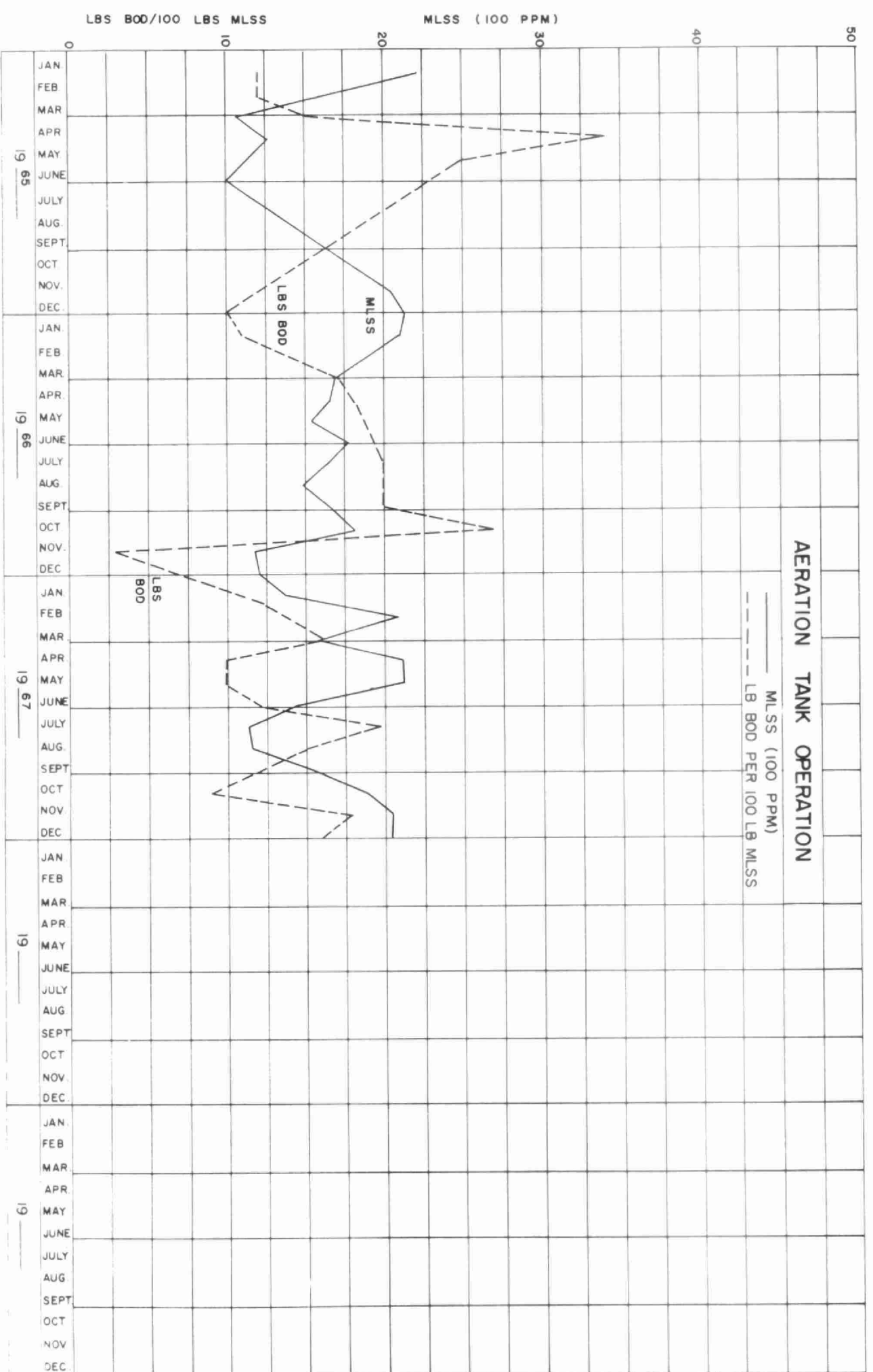
During 1967, a total of 431.3 tons of BOD was removed from the raw sewage by the treatment plant. The average raw sewage BOD concentration was 174 ppm, which was less than the design BOD concentration of 220 ppm.

A total of 665.0 tons of suspended solids was removed during 1967. The average raw sewage suspended solids concentration was 252 ppm which was greater than the design concentration of 220 ppm.

The average final effluent concentrations of BOD and suspended solids of 15 ppm were both within the OWRC effluent objectives.

Considering the raw sewage concentrations of BOD and suspended solids, the average reductions of 90.6% and 93.7% respectively were very good.

An estimated 795 cubic feet of grit was removed during 1967 for an average of 1.3 cubic feet of grit removed per million gallons of waste treated.

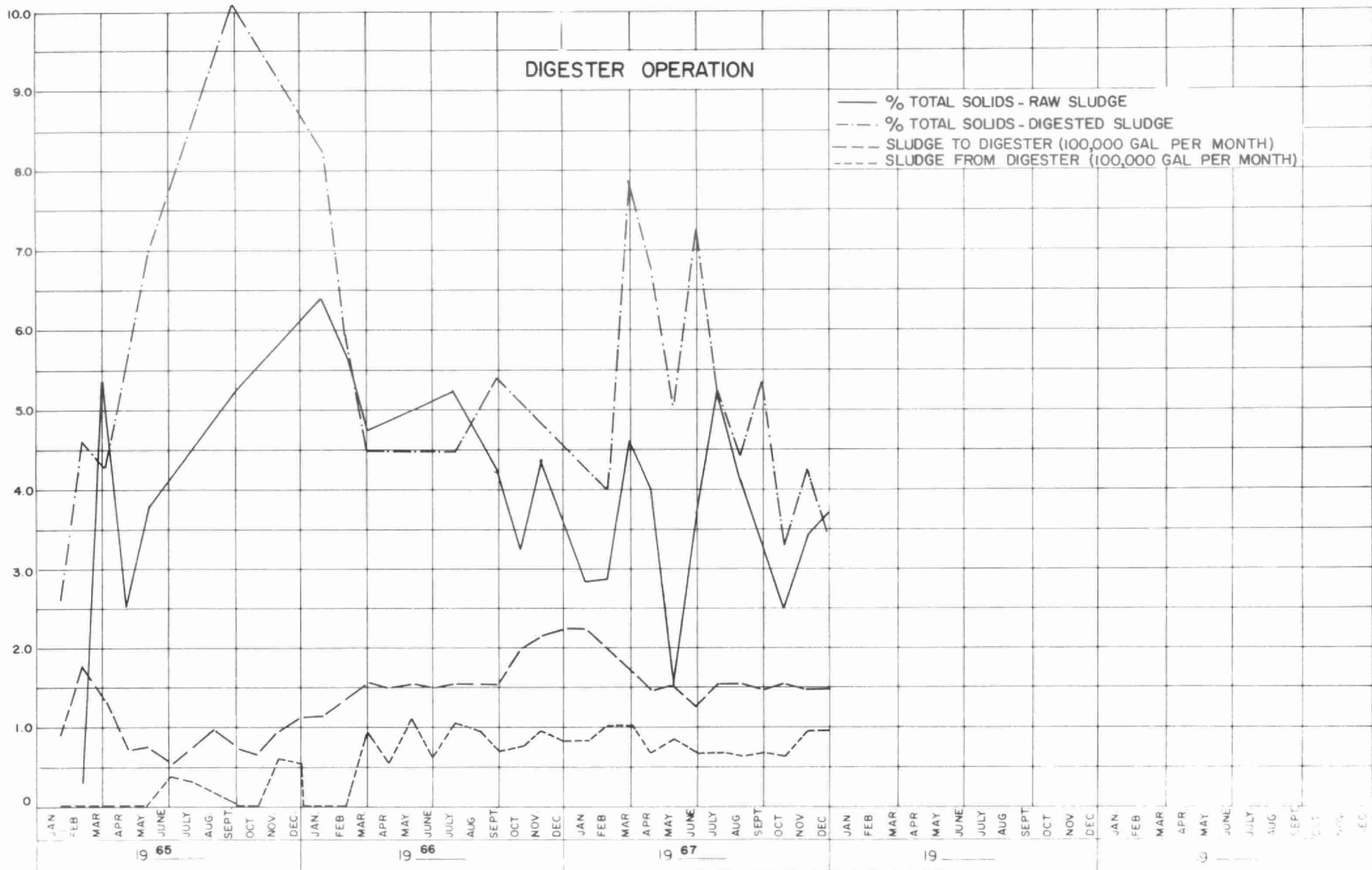


AERATION SECTION

| MONTH | PRIM. EFFL B.O.D. PPM. | MLSS. PPM. | LBS. BOD. PER 100 LBS. M. L. S. S. |
|-----------|---------------------------|---------------|---------------------------------------|
| JANUARY | 81 | 1308 | 11 |
| FEBRUARY | 178 | 2090 | 14 |
| MARCH | 108 | 1576 | 16 |
| APRIL | 74 | 2124 | 10 |
| MAY | 112 | 2128 | 10 |
| JUNE | 57 | 1465 | 12 |
| JULY | 62 | 1145 | 20 |
| AUGUST | 98 | 1167 | 15 |
| SEPTEMBER | 115 | 1571 | 12 |
| OCTOBER | 86 | 1899 | 9 |
| NOVEMBER | 106 | 2054 | 18 |
| DECEMBER | 92 | 2042 | 16 |
| TOTAL | - | - | - |
| AVERAGE | 97 | 1714 | 14 |

COMMENTS

The average primary effluent BOD concentration directed to the aeration tanks was 97 ppm. In conjunction with the average MLSS concentration of 1714 ppm carried in the aeration section, this yielded a loading of 14 pounds of BOD per 100 pounds of MLSS. This loading is lower than the theoretical operating loading of 35 to 50 pounds of BOD per 100 pounds of MLSS for a conventional activated sewage plant.



DIGESTER OPERATION

| MONTH | SLUDGE TO DIGESTERS | | | SLUDGE FROM DIGESTERS | | | GAS PRODUCED 1000'S Cu Ft |
|-------|---------------------|-------------|--------------|-----------------------|-------------|--------------|---------------------------------|
| | GALLONS | % SOLIDS | % VOL MAT | GALLONS | % SOLIDS | % VOL MAT | |
| JAN | 223200 | 2.83 | - | 86429 | 4.28 | - | 397627 |
| FEB | 201600 | 2.86 | - | 103109 | 4.01 | - | 351810 |
| MAR | 170400 | 4.62 | 61.25 | 103109 | 7.84 | 44.26 | 366235 |
| APR | 150000 | 4.00 | 64.50 | 69751 | 6.14 | 39.25 | 279480 |
| MAY | 155000 | 1.58 | 69.62 | 87946 | 5.09 | 44.00 | 331551 |
| JUNE | 130000 | 3.65 | 38.63 | 71266 | 7.23 | 33.20 | 243151 |
| JULY | 155000 | 5.25 | 75.61 | 71267 | 5.52 | 32.42 | 236196 |
| AUG. | 155000 | 4.15 | 57.83 | 66717 | 4.43 | 41.31 | 265404 |
| SEPT. | 150000 | 3.32 | 58.43 | 69750 | 5.39 | 41.93 | 232797 |
| OCT. | 155000 | 2.49 | 62.65 | 65203 | 3.31 | 27.49 | 280945 |
| NOV. | 150000 | 3.43 | 67.06 | 94914 | 4.29 | 47.79 | 310832 |
| DEC. | 150000 | 3.75 | 67.73 | 97044 | 3.39 | 53.68 | 358694 |
| TOTAL | 1945200 | - | - | 986505 | - | - | 3654722 |
| AVG. | 162100 | 3.49 | 62.33 | 82209 | 5.07 | 40.53 | 304560 |

COMMENTS

During 1967, a total of 1,945,200 gallons of raw sludge was pumped to the digesters and a total of 986,505 gallons was removed from the digesters by tank truck.

The laboratory results indicate that a volatile solids reduction of approximately 59 percent was realized. Generally, a volatile solids reduction of 50 percent is considered good digestion; hence, the reduction of volatile matter attained in 1967 at the plant was very good.

A total of 3,654,722 cubic feet of digester gas was produced during the year.

CHLORINATION

| MONTH | PLANT FLOW (MG) | POUNDS CHLORINE | DOSAGE RATE (PPM) |
|-----------|-----------------|-----------------|-------------------|
| JANUARY | 40.378 | - | - |
| FEBRUARY | 33.954 | - | - |
| MARCH | 53.747 | - | - |
| APRIL | 61.145 | - | - |
| MAY | 41.186 | * 1534 | 4.62 |
| JUNE | 65.880 | 2172 | 3.29 |
| JULY | 82.126 | 2639 | 3.21 |
| AUGUST | 40.429 | 2182 | 5.39 |
| SEPTEMBER | 35.657 | 2326 | 6.52 |
| OCTOBER | 44.410 | ** 2005 | 5.18 |
| NOVEMBER | 55.294 | - | - |
| DECEMBER | 52.249 | - | - |
| TOTAL | 606.455 | 12858 | - |
| AVERAGE | 50.538 | 74 | 4.70 |

* Chlorination for 25 days

** Chlorination for 27 days

COMMENTS

Chlorine is used to disinfect the final effluent before discharge to the Holland River. In 1967 the effluent was chlorinated from May 15 to October 1. A total of 12,858 pounds of chlorine was used during this period to provide an average dosage rate of 4.70 ppm. This dosage rate provided a chlorine residual of at least 0.5 ppm after 15 minutes contact time.

LABORATORY LIBRARY



96936000119361

CONCLUSIONS

The plant operated well during 1967 under the capable supervision of the operating staff.

| Date Due | | | |
|----------|--|--|--|
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